

Metallomics- fruitful marriage of the “-omics” fields which can answer questions about forms of metals in biological samples

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### **Abstract**

The concept of metallomics was introduced in 2003 by professor Haraguchi. The idea was to create a new scientific field which would combine different research domains related to the determination of metal forms. It consists in determining the molecular structure, distribution, dynamics, role and impact of metals and metalloids in biological systems.

The presentation will present an example of the analytical workflow used in order to provide maximum information about speciation of Se in baker yeast (*Saccharomyces cerevisiae*).

Till now, most of the methodological developments concerning the analysis of selenized yeast have been focused on the quantitative determination of selenomethionine (SeMet). With this approach the mass balance of the determined selenium species has been showing the existence of “missing” selenium, species that could not be properly identified and determined. In our study additional steps were added to focus on

- i) the identification of the myriad of selenium metabolites allowing the quasi-complete characterization of the water soluble part of the Se yeast metabolome,
  - ii) quantification of selenocysteine (SeCys) which was hardly considered because of the absence of the SeCys insertion codon (UGA)
  - iii) and identification and quantification of Se nano particles produced by yeast
- which allowed identification of all Se forms in the sample.

This type of analytical approach can be applied to different samples (taking into account the need of procedure optimization) in order to answer questions posed by medicinal, environmental, biophysical, cell biology, plant biology and chemical biology communities.